

separated by straight dark bands parallel to the apparent horizon. This occurs whatever may be the average direction of the branches.

In the case of lines formed by the crest of a distant hill (or the Moon's limb) it is assumed that irregularities in the densities of the various strata of the intervening air form the requisite obstructions, and as these irregularities vary from instant to instant, so do the lines move or change. When the source of light subtends a very small angle we have scintillation. From this point of view the dark lines are a phenomenon of scintillation projected on a screen. This hypothesis readily explains the coloured fringes of the eclipse shadow bands seen by some observers.

As seen from the neighbourhood of the Observatory at Dunecht, the Sun sets behind one or other part of the treeless ridge of the Hill of Fare for about nine weeks before and after the winter solstice. For the rest of the year the Sun disappears or reappears behind a wooded horizon far less favourable to the production of a regular phenomenon of the character described. The Sun being now beyond the limits mentioned, these notes are laid before the Society in the hope that some member who resides in a favourable locality may be on the look-out for the bands. It is at least favourable, if not essential, to their visibility that the screen on which they are formed should be protected from side light, and that the observer should be very close to the screen.

A couple of white screens making a known angle with each other and with the horizon, exposed in a room with an open window but with partially closed shutters, would probably be a good arrangement.

On comparing the above with the account of the eclipse shadow bands at p. 47, *Mem. Royal Astronomical Society*, vol. xlv., it occurs to the writer that the apparent rotation of the bands about a distant centre there described was most probably an effect of perspective, just as furrows transverse to a line of railway appear to rotate before the eyes of a traveller. In future eclipses it may be well to see if the bands rotate about *two* opposite centres, or vanishing points.

Dunecht Observatory,
1880, March 6.

Note on the Photographic Diameter of the Moon. By E. Neison, Esq.

In his Note in the *Monthly Notices* for January 1880 (page 167) Prof. Pritchard adduces complete evidence of the accord between the measures made by himself and by the two assistants of the Oxford Observatory. It is with great satisfaction that I learn that the lunar photographs taken at Oxford will permit of such sharp and accordant measures being made. The difference $0''.56$ between the separate results of Mr. Jenkins and Mr. Plummer is insignificant.

I would, however, point out that it is impracticable by means of measuring any single photograph to determine the error introduced through the irregularities on the Moon's limb; so that the evidence adduced by Prof. Pritchard fails to affect the justice of my criticism.

If these irregularities were of the nature of pointed peaks at intervals projecting in the sky, then Prof. Pritchard would be correct. But, in truth, they are great elevations extending along the limb for hundreds of miles at a time, so that it is indifferent from what point you measure: in every case you have a systematic error.

It is this systematic error which is so dangerous; the mere presence of peaks at intervals would give rise to errors which would disappear in the mean.

On some Changes in the Markings of Mars, since the Opposition of 1877. By N. E. Green, Esq.

The details of *Mars* were carefully scrutinised during the past Opposition, in order to identify as far as possible the forms observed at Madeira in 1877, and to detect any changes that might have occurred since that date.

The atmosphere of St. John's Wood has not been favourable, few evenings afforded good views, and even on favourable occasions, either the atmosphere of *Mars* or its brilliant reflection made definition especially trying to the eye. The best views were obtained on nights when *Saturn* was almost put out by fog, which, reducing the glare of *Mars*, served only to make its features more distinctly visible.

However, several drawings were made, the details of which confirm by far the greatest part of the map appended to the drawings of *Mars* in the Memoirs. The various markings have been identified point by point. Indeed, with the exception of a few minute forms, the whole has been re-observed, and where the London air has failed, Professor Niesten at Brussels, Mr. Burton near Dublin, and Mr. Denning at Southampton, have succeeded in drawing just those parts which required confirmation.

Professor Niesten has forwarded a very valuable series of 16 drawings made during the last Opposition, and Mr. Burton has been particularly fortunate in securing some very exact views of the neighbourhood of Terby Sea.

The intention of this Note is to point out a few changes in the surface markings, some of which have special interest, when the drawings of 1879 are compared with those of previous Oppositions. One of these changes is the appearance during November and December 1879 of a band of light in latitude 20° S. extending from longitude 260° to 360° , uniting in one long line of light Dreyer, Hirst and Phillips Islands. To the east of